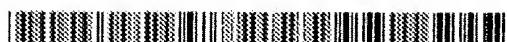


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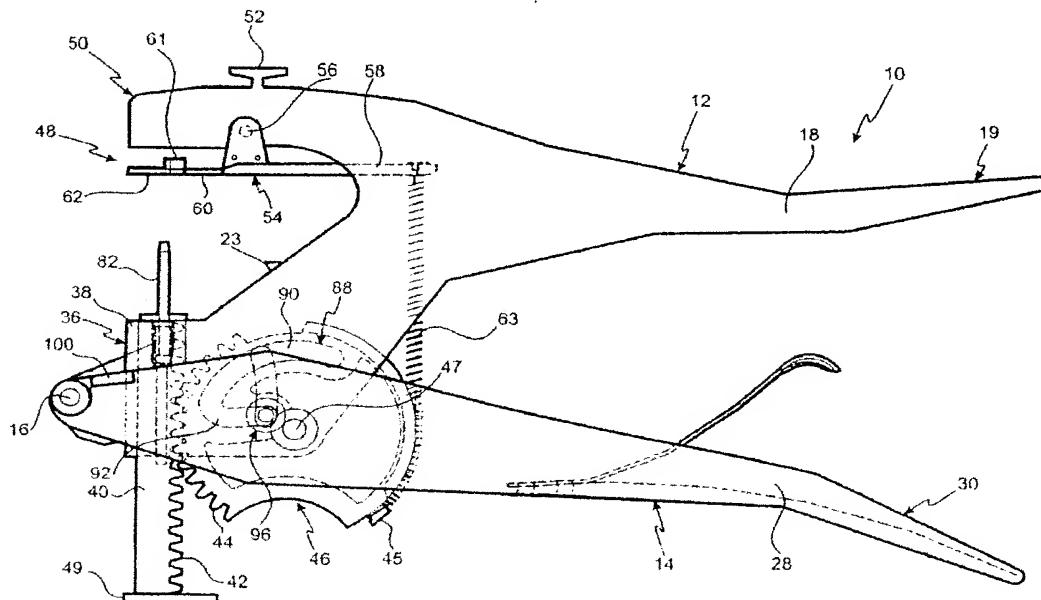
For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

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(54) Title: EAR TAG APPLICATOR



**“Ear Tag Applicator”****Field Of The Invention**

The present invention relates to an ear tag applicator. More particularly, the ear tag applicator of the present invention is intended for use in the simultaneous 5 tagging of an animal and the collection of a biological sample from the same animal.

**Background Art**

At present, blood samples are taken from livestock for DNA/RNA verification and identification purposes. The known procedures for this process typically require a 10 skilled person, such as a veterinarian, to draw blood and collect the blood samples. As such, this procedure can be both inconvenient and expensive for the livestock owner.

A further problem associated with present sampling and identification methods is that of confusion amongst samples that may result from mislabelling.

15 Livestock are typically ear tagged at present for identification purposes. This process requires that the livestock be brought together and that each individual animal be tagged. It would be advantageous if a suitable DNA/RNA sample could be taken at the same time, in the same action. A suitable device for the collection of such a sample is described in International Patent Application 20 PCT/EP98/03075 (WO 99/61882), the content of which is incorporated herein by reference in its entirety. However, no ready means is known for the attachment of the ear tag described therein and the ready removal of the sample receiving container associated therewith.

The term ‘livestock’ is understood to include cattle, pigs, sheep and goats, but is 25 not necessarily to be limited thereto.

The ear tag applicator has as one object thereof to overcome substantially, or at least provide an alternative to, the abovementioned problems associated with the prior art.

The preceding discussion of the background art is intended to facilitate an understanding of the present invention only. It should be appreciated that the discussion is not an acknowledgement or admission that any of the material referred to was part of the common general knowledge in Australia as at the priority date of the application.

Throughout the specification, unless the context requires otherwise, the word "comprise" or variations such as "comprises" or "comprising", will be understood to imply the inclusion of a stated integer or group of integers but not the exclusion of any other integer or group of integers.

### **Disclosure Of The Invention**

In accordance with the present invention there is provided an ear tag applicator characterized by comprising first and second arms, the arms being pivotally interconnected, each arm having a handle formed at a first end thereof for gripping, a second end of the first arm forming upper and lower jaws defining a mouth to receive an animal ear to be tagged, a second end of the second arm being pivotally interconnected to the lower jaw of the first arm, wherein there are provided on or adjacent the upper and lower jaws respectively means for releasably mounting a component of an animal ear tag.

Preferably, the lower jaw of the first arm engages an actuatable post forming at least part of the mounting means. The rotation of the arms about their pivotal interconnection preferably induces movement in the actuatable post to move a component of an animal ear tag mounted thereon towards another component mounted on the upper jaw.

Still preferably, the actuatable post has an engagement means provided thereon for positively locating thereon the ear tag component.

Further preferably, the upper jaw of the first arm has provided thereon an engagement means to positively locate thereat a further ear tag component.

Still further preferably, a cog is pivotally located in the lower jaw of the first arm and positively engages the actuatable post, whereby pivoting movement of the 5 second arm relative to the first jaw induces rotation of the cog and in turn, movement of the actuatable post. The cog is preferably biased such that the actuatable post is held in a retracted position other than when the first and second arms are drawn together. Further, the relative movement of the first and second arms induces movement in the cog through a guide member mounted on the 10 second arm and received by a guide slot provided in the cog.

The guide slot of the cog is preferably arranged to first allow deployment of the actuatable post to position an ear tag component and to then reach a point in the rotation of the cog at which the biasing of the cog causes counter-rotation therein and the retraction of the actuatable post. The guide slot still preferably comprises 15 integrally formed radial and circumferential portions.

The animal ear tag is preferably provided in three portions comprising a locking portion, a flag portion and a sample portion. The three portions preferably interact during the tagging operation such that a tip of the locking portion is pressed through the animal ear, through the flag portion and into the sample portion, 20 capturing a biological or tissue sample in the process. The tip of the locking portion remains with the sample portion whilst its remainder locates the flag portion on the animal ear.

The biased counter-rotation of the cog and the retraction of the actuatable post preferably allows/facilitates separation of both the flag and sample portions, and 25 the tip and the remainder of the locking portion, of the animal ear tag.

**Brief Description of The Drawings**

The present invention will now be described, by way of example only, with reference to one embodiment thereof and the accompanying drawings, in which:-

5       Figure 1 is a diagrammatic side elevation of an ear tag applicator in accordance with the present invention;

Figure 2 is a side view of a first arm of the ear tag applicator of Figure 1;

Figure 3 is a side view of a second arm of the ear tag applicator of Figure 1;

10      Figure 4 is an upper perspective view of the ear tag applicator of Figure 1, showing an ear tag being positioned therein prior to application;

Figure 5 is an upper perspective view of the ear tag applicator of Figure 1, showing the specific location of the components of the ear tag and their position when received in the ear tag applicator;

15      Figure 6 is a lower perspective view of the ear tag applicator of Figure 1 applying the ear tag to an ear of an animal;

Figure 7 is a lower perspective view of the ear tag applicator of Figure 1 shortly after application of the ear tag to the ear of an animal and showing a sample portion of that ear tag retained in the ear tag applicator;

20      Figure 8 is a lower perspective view of the ear tag applicator of Figure 1, showing the sample portion of the ear tag removed from the ear tag applicator; and

Figure 9 is a lower perspective view of the ear tag applicator of Figure 1, showing a user 'recharging' or resetting the mechanism thereof.

**Best Mode(s) For Carrying Out The Invention**

In Figures 1 and 4 to 9 there is shown an ear tag applicator 10 comprising a first arm 12 and a second arm 14. The arms 12 and 14 are pivotally interconnected about a pivot point 16.

5 The first arm 12, as shown in Figure 2, comprises a handle 18 formed at a first end 19 thereof for gripping, and a second end of the arm 12 further comprises upper and lower jaws, 20 and 22 respectively. The jaws 20 and 22 define therebetween a mouth 24 to receive an animal ear 26, as is best seen in Figure 6. A rest 23 projects from a rear surface 25 of the mouth 24, as shown in Figures 1  
10 and 2.

The second arm 14, as shown in Figure 3, comprises a handle 28 at a first end 30 thereof for gripping. The pivotal connection 16 is provided at a second end 32 of the second arm 14. The second end 32 of the arm 14 defines a slot 34, best seen in Figures 4 and 5, through which the lower jaw 22 of the first arm 12 is received  
15 in part. The pivot point 16 passes through a forward portion of the lower jaw 22 of the first arm 12, as seen in Figure 2.

A first mounting means 36 is provided on the lower jaw 22 adjacent the forward portion thereof, as is best seen in Figures 1 and 5. The first mounting means 36 comprises a guide member 38 and an actuatable post 40 held slidably therein. The  
20 actuatable post 40 has provided in a rear surface thereof a series of teeth 42 which engage a series of teeth 44 provided on a cog 46 pivotally located within the lower jaw 22. A thumb rest 49 is provided on a lower end of the actuatable post 40. Relative movement of the first arm 12 and second arm 14, about the pivot point 16, causes rotation of the cog 46 about a pivot point 47, shown in Figures 1 and 2,  
25 and further causes the actuatable post 40 to move either up or down with respect to the guide member 38.

The upper jaw 20 of the first arm 12 comprises a second mounting means 48 adjacent a second end 50 thereof. A locating lug 52 is provided on an upper surface of the first arm 12 substantially adjacent the second end 50 thereof.

Similarly located adjacent the second end 50 is a pivotal retaining means 54. The pivotal retaining means 54 is attached to the upper jaw 20 about a pivot point 56 and comprises a retaining plate 60, the retaining plate 60 projecting partially into the mouth 24 and defining a pair of forwardly projecting tongues 62. The retaining plate 60 further comprises a rearwardly projecting anchor plate 58 which acts as an anchor point for one end of a biasing means, for example a spring 63. The spring 63 is attached at its other end to an anchor point 45 on the cog 46 so as to bias the cog 46 in an anti-clockwise manner about the pivot 47. This arrangement acts to bias the actuatable post 40 in the retracted position of Figures 10 1, 4, 5, 7 and 8.

Any reference to clockwise or anti-clockwise is to be read with reference to the orientation of the ear tag applicator 10 as shown in Figure 1.

An ear tag 64 is also shown in Figures 4 and 5, being of the type generally described in WO 99/61882, the ear tag 64 comprising a locking portion 66, a flag portion 68 and a sample portion 70. The locking portion 66 comprises a broad base 72 and stem 74 upstanding therefrom. A blind cavity 76 extends from the broad base 72 through the stem 74 and terminates at a detachable tip 78. The connection between the tip 78 and the stem 74 is frangible and a narrow collar 80 is provided about the stem 74 adjacent this frangible connection.

20 An engagement means, for example a spike 82, best seen in Figure 1, is provided on the actuatable post 40, allowing the positive location of the locking portion 66 of the ear tag 64 thereon. The spike 82 is releasably located in the cavity 76 of the base 72 and stem 74 of the locking portion 66. The rest 23 acts, by way of a gentle interference fit, to retain the broad base 72 of the locking portion 66 and 25 prevent it from falling off the spike 82, best seen in Figures 4 and 5.

The flag portion 68 and sample portion 70 of the ear tag 64 are initially connected by a further frangible connection 71, as shown in Figure 4. The flag portion 68 comprises a substantially flat tag-like surface 73 on which an identification number or other identification marking may be provided. The sample portion 70 30 comprises a sample receiving container or chamber 84 at one end thereof, and a

length of material 85 extending therefrom. The other end of the length of material 85 having an aperture 86 located therein. The sample chamber 84 is locatable in the mounting means 48, as shown best in Figures 4 and 5, and the retaining means 54 acts to positively locate the flag portion 68 and sample portion 70 as 5 shown in Figure 5. The retaining plate 60 has provided thereon locating ridges 61 to orientate the flag portion 68 with respect thereto, as shown in Figures 4 and 8.

The cog 46 has a guide slot 88 provided therein, comprising a circumferential portion 90 and a radial portion 92, as best seen in Figure 1. A guide member 94 10 is received through the slot 88 and is fixed to the second arm 14 at mounting points 96. The guide member 94 extends through slots 98 provided in the lower jaw 22 of the first arm 12.

In use, a user (not shown) wishing to tag the ear 26 of an animal (not shown) fits the locking portion 66 of the ear tag 64 to the first mounting means 36 as 15 described hereinabove. Similarly, the connected flag portion 68 and the sample portion 70 of the ear tag 64 are fitted to the upper jaw 20 as described hereinabove. The retaining means 54 is pivoted about its pivot point by the user, as shown in Figure 4, which at least partially opens the mounting means 48 and allows the sample portion 70 of the ear tag 64 to be inserted in the direction of 20 arrow A until the flag portion 68 abuts the locating ridges 61. The retaining means 54 is closed by the action of the spring 63 acting on the anchor plate 58.

The length of material 85 of the sample portion 70 extending away from the sample chamber 84 is looped, by the user, upwardly and rearwardly in the direction of arrow B to engage the aperture 86 with the lug 52, as shown in Figure 25 5. This further acts to positively locate both the flag portion 68 and the sample portion 70 of the ear tag 64 with respect to the upper jaw 20.

The animal ear 26 is positioned by the user in the mouth 24 between the jaws 20 and 22, and consequently between the locking portion 66 and the remaining portions 68 and 70 of the ear tag 64. It is preferred that the ear tag 64 be located 30 between the two cartilage stems of the ear 26. The user then may squeeze the

handles 18 and 28 together as shown in Figure 6. This action causes the cog 46 to rotate in a clockwise direction about the pivot point 47, shown as arrow C. As the handles 18 and 28 are drawn together the guide member 94 is drawn upwardly through the slot 98 in the lower jaw 22 and induces clockwise rotation of 5 the cog 46 as the guide member 94 moves along the radial portion 92 of the slot 88. This rotation of the cog 46 extends the spring 63. This causes a consequent upward movement in the direction of arrow D in the actuatable post 40 through the guide member 38.

This action, best seen in Figure 6, forces the tip 78 and stem 74 of the locking 10 portion 66 of the ear tag 64 through the ear 26, the tip 78 and collar 80 passing between tongues 62 of the retaining member 54 and through an aperture created in the flag portion 68. The collar 80 is broader than the aperture created in the flag portion 68 and acts to lock the locking portion 66 and flag portion 68 together on the animal ear 26. The tip 78 is however forced further into the sample 15 chamber 84 of the sample portion 70. The tip 78 is provided with an uppermost recess 79 which acts to punch an aperture in the flag portion 68 and the ear 26, and to then collect a tissue sample from the ear 26 of the animal whilst passing therethrough. This tissue sample is then retained within the tip 78 which is itself in turn retained within the sample chamber 84. In this manner the single operation 20 of attaching an ear tag 64 also achieves the collection of a tissue sample for DNA identification and verification purposes in a form that discourages tampering.

Preferably, the handles 18 and 28 of the ear tag applicator 10 should be operated gently, and only pressed hard and fast once the tip 78 has reached the skin of the animal's ear 36. A characteristic crunching noise will indicate completed 25 perforation of the flag portion 68 and the ear 36 and lodgment of the tip within the sample chamber 84.

The actuatable post 40 then returns instantaneously, or 'jumps back', to the position shown in Figure 1, through the action of the guide member 94 passing into the circumferential portion 90 of the slot 90 in the cog 46. The passage of the guide 30 member 94 into the circumferential portion 90 of the slot 90 allows the tension in the spring 63 to rotate the cog 46 in an anticlockwise direction and return the

actuable post 40 to the general orientation of Figure 1. Importantly, the cog 46 is not in the same specific position shown in Figure 1 as the guide member 94 is located at this time in the circumferential portion 90 of the slot 88. Also, the handles 18 and 28 have not sprung apart to the position of Figure 1, again due to 5 the particular location of the guide member 94 in the slot 88. To return the cog 46 to the specific position of Figure 1 it is necessary to 'recharge' the ear tag applicator 10.

The 'jumping back' of the actuable post 40 allows the release of the ear tag applicator 10 from the now tagged animal, as shown in Figure 7. As the ear tag 10 applicator 10 is pulled away from the animal by the user, the frangible connection between the flag portion 68 and the sample portion 70 is broken. This action leaves the locking and flag portions 66 and 68 of the ear tag 64 attached to the ear 26. Further, the frangible connection between the tip 78 and the stem 74 of the ear tag 64 is similarly broken. The sample portion 70, with the tip 78 and 15 tissue sample now contained within the sample chamber 84, is held or retained by the retaining means 54 in the mounting means 48, as shown in Figure 7. The sample portion 70 may then be removed from the ear tag applicator 10, as shown in Figure 8, as desired by the user. It is envisaged that the pivotal connection between the arms 12 and 14 may be sprung with additional biasing means, as 20 shown in Figure 1, so as to bias the arms 12 and 14 into the position shown in Figures 1, 4 and 5, as opposed to that position shown in Figures 6 to 8.

Recharging of the ear tag applicator 10, as shown in Figure 9, is achieved through the user gripping finger grips 100 provided either side of the guide member 38 and applying pressure to the thumb rest 49 in the direction of arrow E. This has 25 the effect of causing rotation of the cog 46 in an anticlockwise direction, thereby returning the guide member 94 to the radial portion 92 of the slot 88 as it passes along the slot 98, and causing the handles 18 and 28 to part, to ultimately again reach the position shown in Figure 1.

It is further envisaged that the flag portion 68 and the sample portion 70 will be 30 provided with coordinated identification information so as to directly link the tissue sample retained within the sample chamber 84 with the individual animal tagged.

- 10 -

Known methods for the evaluation of the tissue sample, for example traditional PCR technology, may then be utilised to provide specific information on the identification of that animal. It is to be noted that the sample chamber 84 is effectively sealed once the tip 78 of the locking portion 66 is received therein

5 thereby minimising the possibility of any contamination of the tissue sample.

Modifications and variations such as would be apparent to the skilled addressee are considered to fall within the scope of the present invention.

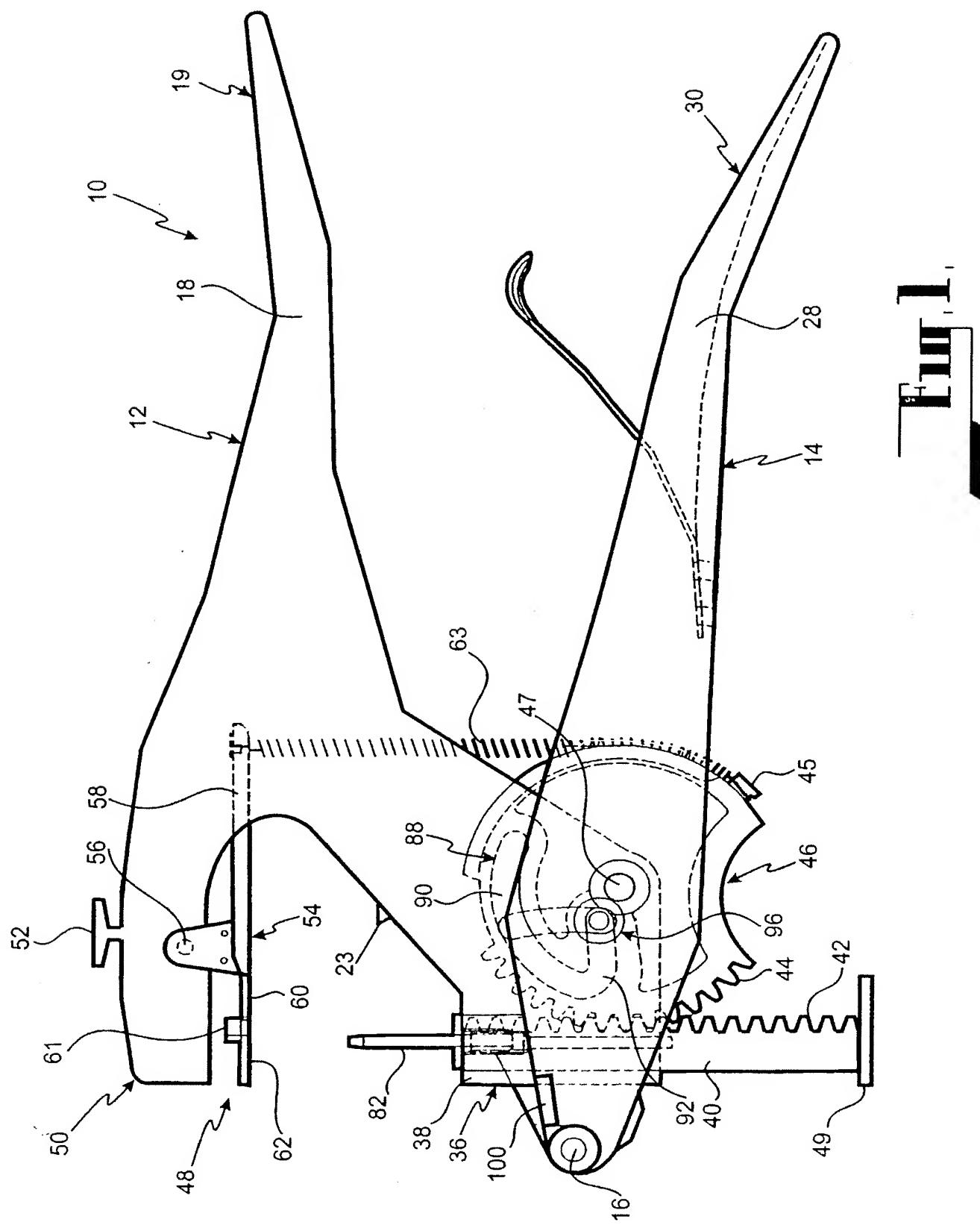
**Claims**

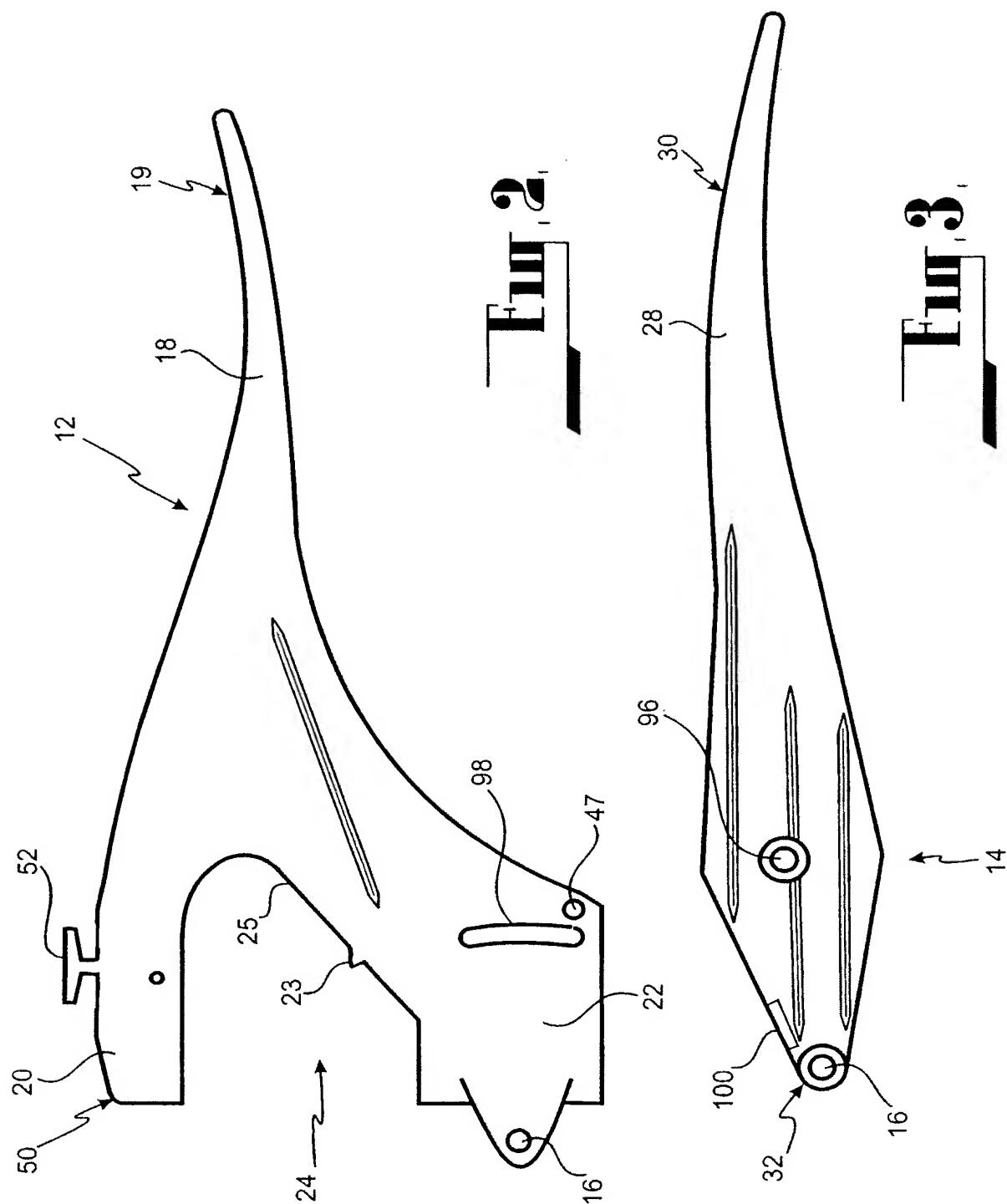
1. An ear tag applicator characterised by comprising first and second arms, the arms being pivotally interconnected, each arm having a handle formed at a first end thereof for gripping, a second end of the first arm forming upper and lower jaws defining a mouth to receive an animal ear to be tagged, a second end of the second arm being pivotally interconnected to the lower jaw of the first arm, wherein there are provided on or adjacent the upper and lower jaws respectively means for releasably mounting a component of an animal ear tag.  
5
10. 2. An ear tag applicator according to claim 1, characterised in that the lower jaw of the first arm engages an actuatable post forming at least part of the mounting means.
15. 3. An ear tag applicator according to claim 1 or 2, characterised in that the rotation of the arms about their pivotal interconnection preferably induces movement in the actuatable post to move a component of an animal ear tag mounted thereon towards another component mounted on the upper jaw.
20. 4. An ear tag applicator according to claim 2 or 3, characterised in that the actuatable post has an engagement means provided thereon for positively locating thereon the ear tag component.
25. 5. An ear tag applicator according to any one of the preceding claims, characterised in that the upper jaw of the first arm has provided thereon an engagement means to positively locate thereat a further ear tag component.
6. An ear tag applicator according to any one of claims 2 to 5, characterised in that a cog is pivotally located in the lower jaw of the first arm and positively engages the actuatable post, whereby pivoting movement of the second arm relative to the first jaw induces rotation of the cog and in turn, movement of the actuatable post.

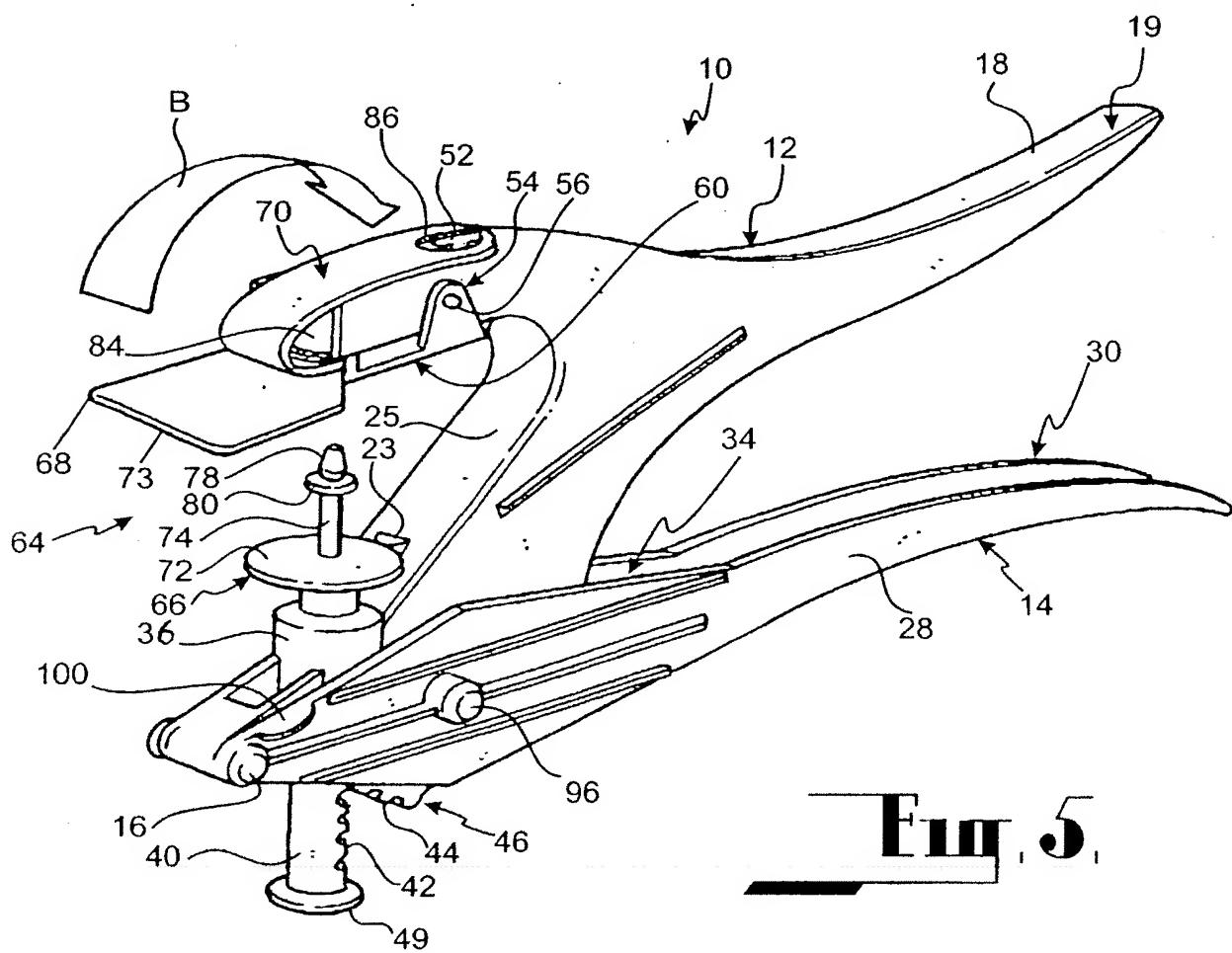
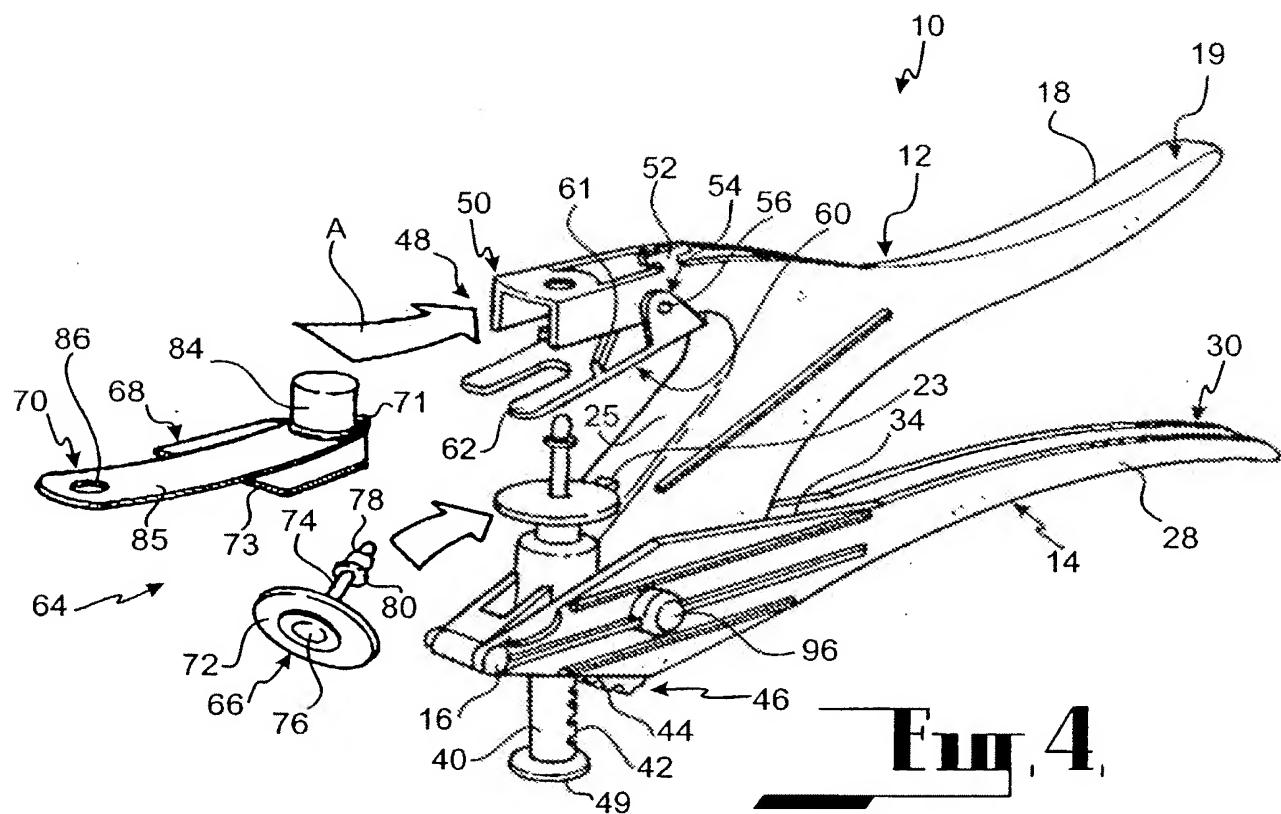
7. An ear tag applicator according to claim 6, characterised in that the cog is biased such that the actuatable post is held in a retracted position other than when the first and second arms are drawn together.
8. An ear tag applicator according to claim 6 or 7, characterised in that the relative movement of the first and second arms induces movement in the cog through a guide member mounted on the second arm and received by a guide slot provided in the cog.
9. An ear tag applicator according to any one of claims 6 to 8, characterised in that the guide slot of the cog is arranged to first allow deployment of the actuatable post to position an ear tag component and to then reach a point in the rotation of the cog at which the biasing of the cog causes counter-rotation therein and the retraction of the actuatable post.
10. An ear tag applicator according to any one of claims 6 to 8, characterised in that the guide slot comprises integrally formed radial and circumferential portions.
11. An ear tag applicator according to any one of the preceding claims, characterised in that the animal ear tag to be utilised therewith is provided in three portions comprising a locking portion, a flag portion and a sample portion.
12. An ear tag applicator according to any one of the preceding claims, characterised in that the three portions interact during the tagging operation such that a tip of the locking portion is pressed through the animal ear, through the flag portion and into the sample portion, capturing a biological or tissue sample in the process.
13. An ear tag applicator according to claim 12, characterised in that the tip of the locking portion remains within the sample portion whilst its remainder locates the flag portion on the animal ear.

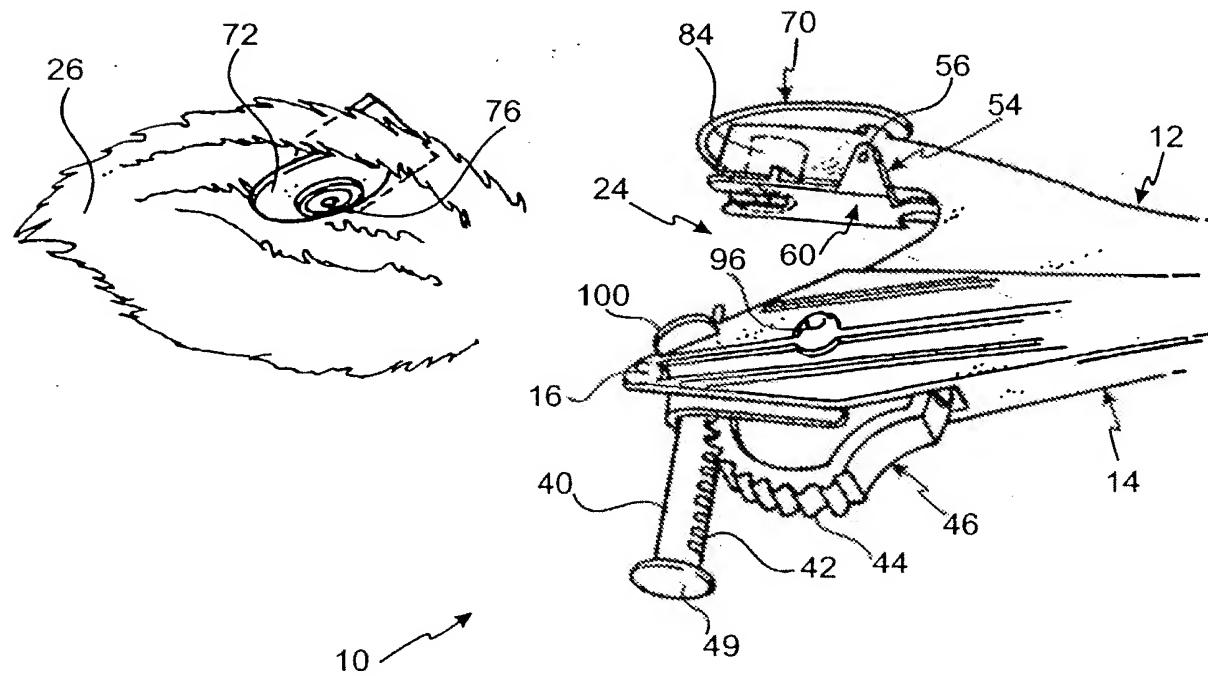
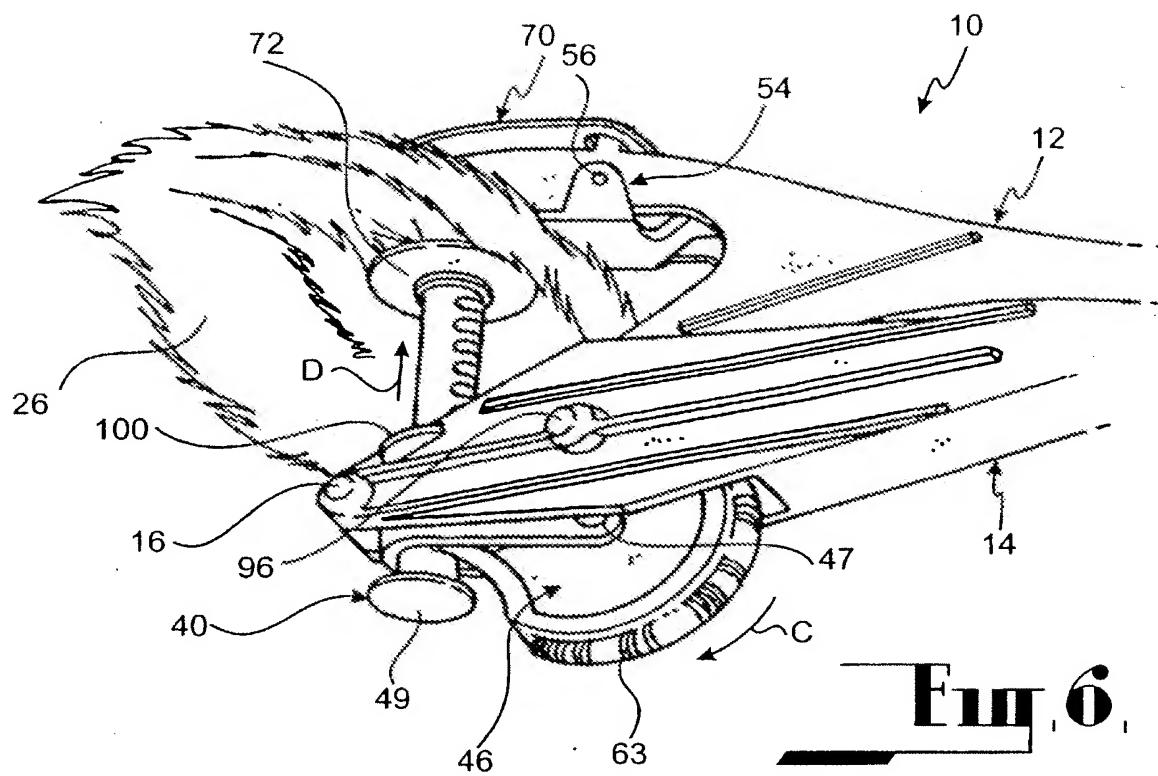
- 13 -

14. An ear tag applicator according to claim 13, characterised in that the biased counter-rotation of the cog and the retraction of the actuatable post allows/facilitates separation of both the flag and sample portions, and the tip and the remainder of the locking portion, of the animal ear tag.
- 5 15. An ear tag applicator substantially as hereinbefore described with reference to the accompanying drawings.

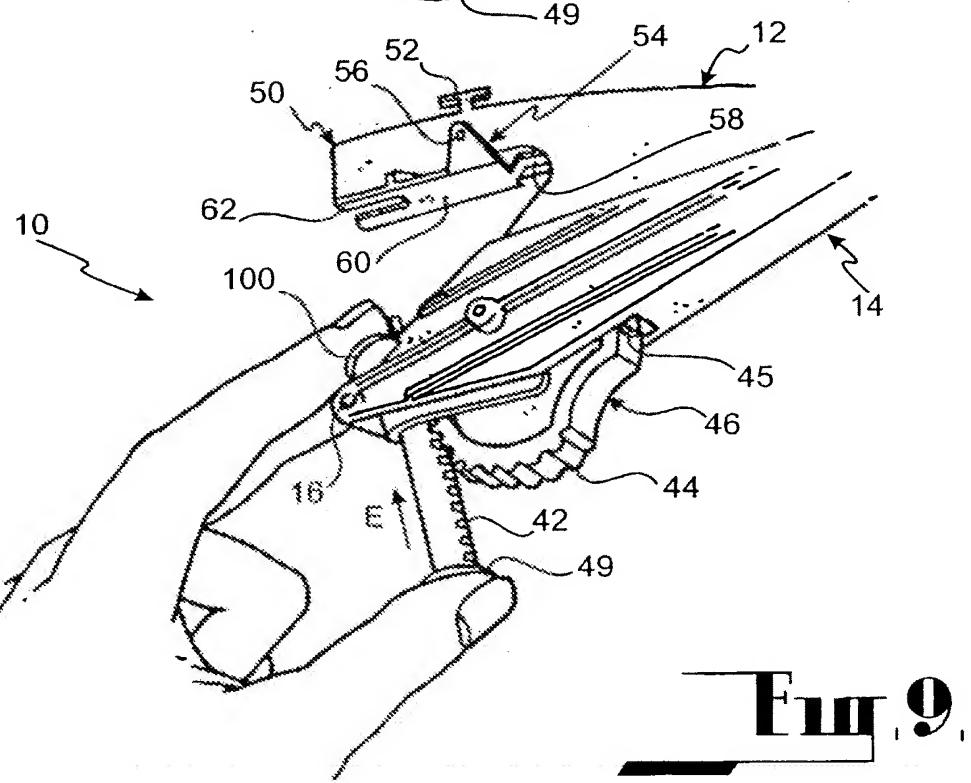
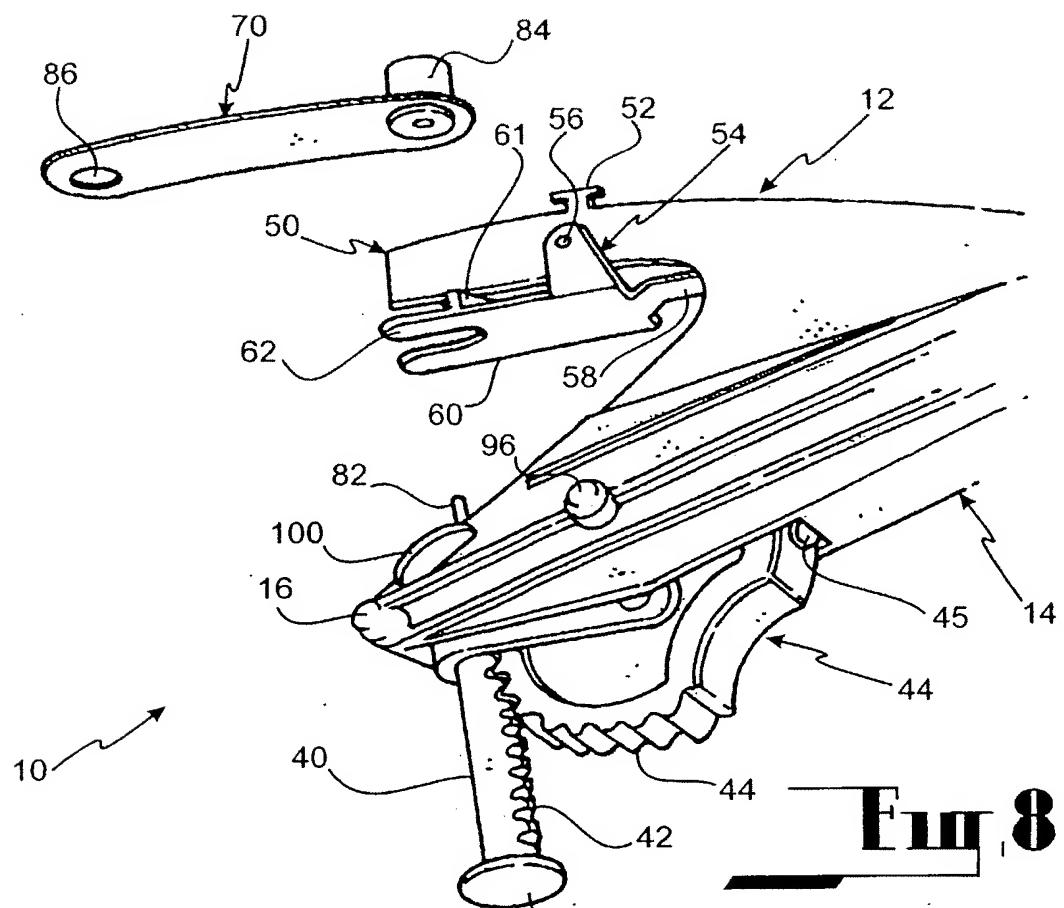








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## INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU01/00342

<b>A. CLASSIFICATION OF SUBJECT MATTER</b>																						
Int. Cl. <sup>7</sup> : A01K 11/00																						
According to International Patent Classification (IPC) or to both national classification and IPC																						
<b>B. FIELDS SEARCHED</b>																						
Minimum documentation searched (classification system followed by classification symbols) IPC: A01K 11/00																						
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched IPC: AS ABOVE																						
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) DWPI and key words																						
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>																						
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.																				
X Y	US 4932953 A (COHR) 12 June 1990 Whole document AU 1754/21 A (VENTURI) 25 October 1921 Whole document	1-7 11-14																				
X	EP 1060662 A (PRAGMATIC NETWORK CREATIONS ETS) 20 December 2000. Whole document	1-7																				
P, Y		11-14																				
<input type="checkbox"/> Further documents are listed in the continuation of Box C <input checked="" type="checkbox"/> See patent family annex																						
<p>* Special categories of cited documents:</p> <table> <tr> <td>"A"</td> <td>document defining the general state of the art which is not considered to be of particular relevance</td> <td>"T"</td> <td>later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</td> </tr> <tr> <td>"E"</td> <td>earlier application or patent but published on or after the international filing date</td> <td>"X"</td> <td>document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</td> </tr> <tr> <td>"L"</td> <td>document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</td> <td>"Y"</td> <td>document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</td> </tr> <tr> <td>"O"</td> <td>document referring to an oral disclosure, use, exhibition or other means</td> <td>"&amp;"</td> <td>document member of the same patent family</td> </tr> <tr> <td>"P"</td> <td>document published prior to the international filing date but later than the priority date claimed</td> <td></td> <td></td> </tr> </table>			"A"	document defining the general state of the art which is not considered to be of particular relevance	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention	"E"	earlier application or patent but published on or after the international filing date	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone	"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art	"O"	document referring to an oral disclosure, use, exhibition or other means	"&"	document member of the same patent family	"P"	document published prior to the international filing date but later than the priority date claimed		
"A"	document defining the general state of the art which is not considered to be of particular relevance	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention																			
"E"	earlier application or patent but published on or after the international filing date	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone																			
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art																			
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"P"	document published prior to the international filing date but later than the priority date claimed																					
Date of the actual completion of the international search <u>1 May 2001</u>		Date of mailing of the international search report <u>9 May 2001</u>																				
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaaustralia.gov.au Facsimile No. (02) 6285 3929		Authorized officer <b>L. DESECAR</b> Telephone No : (02) 6283 2381																				

**INTERNATIONAL SEARCH REPORT**  
Information on patent family members

International application No.  
**PCT/AU01/00342**

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report				Patent Family Member			
US	4932953	AU	27073/88	GB	8829587	GB	2212092
		NZ	223074	ZA	8809410		
END OF ANNEX							